Pathophysiology and clinical implications of late coronary thrombosis after implantation of drug eluting stents in patients with manifest atherosclerosis

Abstract

Drug-eluting stents (DES) have markedly reduced restenosis rates compared with bare metal stents (BMS) in controlled randomized trials. Concerns have been raised about a possibly increased incidence of stent thrombosis (ST) after discontinuation of dual antiplatelet treatment compared with BMS. While a restenosis is relatively benign process, this serious complication is an issue because mortality of such event is reaching almost 50%. Among well recognized predictors of late stent thrombosis (delayed endothelisation, renal failure, bifurcation lesions, diabetes, premature antiplatelet therapy discontinuation, slow thrombus disappearance), the stent under expansion and stent deployment technique are also considered to be a contributor for development of late stent thrombosis. There was a paucity of data regarding the IVUS guidance during DES implantation. The aim of this study was to assess the role of IVUS guidance during implantation of DES on longterm outcome in patients with high clinical and angiographic risk profile.

Methods: Between January 2004 and December 2005, 2110 patients underwent percutaneous coronary intervention, including 276 patients (13%) who were treated with drug-eluting stents. At the 6-month follow-up, 273 patients remained event-free and of these, have been completed the 12-month and 18-month follow-ups and have been enrolled in the analysis. Dual antiplatelet treatment was administered for 6 months in all patients. In the second phase of the project we have analyse two hunderd and ten patients were randomly assigned 1:1 to receive DES either with or without the IVUS guidance. At 18-month follow-up, the rates of major adverse cardiac events (MACEs) (death, myocardial infarction, and reintervention) were assessed in both groups with special attention to possible LST. Stent thrombosis was classified according to Academic Research Consortium (ARC).

Results At the 18-month follow-up, stent thrombosis had occurred in 10 patients (5.8%), resulting in five sudden deaths and five target-vessel nonfatal myocardial infarctions. The majority (80%) of the events had developed within 7–12 months. The larger stent area and left main interventions were significantly associated with stent thrombosis (P= 0.031 and P =0.001, respectively). At the 18-month follow-up, there was no significant difference between both groups regarding MACE (11% vs. 12%; p = NS). Stent thrombosis has occurred in 4% in the group with and in 6%; p = NS in the group without the IVUS guidance.

Our study confirmed worrisome results concerning drug-eluting stent thrombosis after the discontinuation of dual antiplatelet treatment. The rate of stent thrombosis-related events in our high-risk cohort of patiens reached almost 6% with a 50% mortality. ln our randomized trial we failed to demonstrate the superiority of the IVUS guidance during DES implantation over standard high-pressure postdilatation. However we confirmed worrisome results concerning DES thrombosis after discontinuation of dual antiplatelet-treatment with documented stent thrombosis.